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Original article

Early detection of HIV infection and of asymptomatic sexually transmitted infections among men who have sex with men☆

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ABSTRACT

Objective: To provide data on incidence of early diagnosis of HIV infections and define prevalence and incidence of asymptomatic sexually transmitted infections (STI) in men who have sex with men (MSM).
Methods: We assessed a prospective cohort study of HIV-uninfected MSM at high risk for HIV infection. Participants were selected through a risk-assessment questionnaire, and they were screened for HIV infection (quarterly) and for other STI (yearly): syphilis, and hepatitis A, B and C (serology); *Chlamydia trachomatis* and *Neisseria gonorrhoeae* in penis and rectum; and human papillomavirus in anus and mouth (PCR).
Results: Between November 2009 and October 2012, a total of 258 HIV-uninfected MSM at high risk for HIV infection were included and followed up for a median of 2 years (interquartile range 1.4, 2.5). Nineteen acute HIV infections were diagnosed (incidence, 3.9 per 100 person-years). Prevalence of STI at baseline was follows: syphilis 8.4% (95% confidence interval (CI) 5.4–12.7); hepatitis C virus (HCV) 2.0% (95% CI 0.7–4.8); *C. trachomatis* in penis 3.2% (95% CI 1.5–6.5) and in rectum 6.5% (95% CI 3.9–10.5); *N. gonorrhoeae* in penis 2.0% (95% CI 0.8–5.0) and in rectum 6.1% (95% CI 3.6–10.1); human papillomavirus in anal canal 75.7% (95% CI 68.8–81.5) and in mouth 3.8% (95% CI 1.8–7.7).
Conclusions: The implementation of the Check-Ear Project in a MSM community centre allowed for the identification of early HIV infections and asymptomatic STI among MSM. The high incidence of HIV infections and the high prevalence of STI strongly support the recommendation of periodic screenings among sexually active MSM. **J. Coll, Clin Microbiol Infect 2018;24:540**

Introduction

HIV prevalence and incidence are still increasing in men who have sex with men (MSM) [1,2]. An important factor contributing to this increase are undetected HIV infections and acute infections with high HIV virus loads (F. van Griensven *et al.*, paper presented at 7th International AIDS Society Conference on HIV Pathogenesis, Treatment and Prevention, Kuala Lumpur, 2013, abstract WELBC03)

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[3–8]. Another contributing factor is sexually transmitted infections (STI), which can increase the risk of HIV transmission [9].

Early diagnosis of HIV infection by timely screening among at-risk individuals is one of the cornerstones of prevention of transmission, and it is an opportunity to initiate early antiretroviral therapy. Early diagnosis is critical because a large proportion of transmissions occur in the early phase of infection, the result of the usually high virus load at this stage and an individual's lack of awareness of infection. It is also beneficial for infected individuals because a delayed diagnosis is associated with a worse prognosis despite antiretroviral therapy. Furthermore, newer evidence further supports a beneficial effect on long-term immunity and virus reservoir when infected individuals are treated early [10–14].

Several studies have documented associations between STI and HIV acquisition [15]. Community-based organizations can play an important role by facilitating this population's access to the HIV test and to contribute to create the conditions to start early antiretroviral therapy [16,17]. We created a project on the early diagnosis of HIV infection and of asymptomatic STI, based on a community-based organization serving the MSM community (BCN Checkpoint) in Barcelona, Spain (Check-Ear Project). This project consists of a sexual health screening program created *ad hoc* for early detection of HIV and asymptomatic STI.

The aim of the present study was to assess the ability to earlier detection of HIV and STI among MSM attending the BCN Checkpoint by means of estimating the incidence of both HIV and STI in a cohort of MSM attending this service.

Patients and Methods

Study design

This prospective cohort study studied HIV-uninfected MSM at high risk for HIV infection. The study was carried out at the BCN Checkpoint facilities and the HIV unit of Barcelona's Clinic hospital. The study protocol was reviewed and approved by the local independent ethic committees. Written informed consent was obtained from all participants.

Study population

We performed consecutive-subject recruitment of MSM who attended the BCN Checkpoint. Men were informed of the study and invited to participate. The subjects included in this study had to be ≥18 years old and MSM at high risk for HIV infection but with negative HIV serology at baseline. High risk for HIV infection was defined as having at least one of the following criteria within the previous 6 months: inconsistent or no use of condoms, any STI and/or engaging in transactional sex.

An electronic case report form was created *ad hoc*. The following data were collected: date of birth; date of the clinical controls and sample collections; use of drugs; sexual behaviour (questionnaire); existing STI, including syphilis; hepatitis A, B and C; *Chlamydia trachomatis* in penis and rectum; *Neisseria gonorrhoeae* in penis and rectum; and human papillomavirus (HPV) infection in anal canal and mouth. Moreover, anal canal cytologic results were also recorded, as follows: normal, low-grade squamous intraepithelial lesion, high-grade squamous intraepithelial lesion and atypical squamous cells of undetermined significance. At the moment of HIV infection, additional data were collected, including date of diagnosis, plasma virus load and CD4 cell count.

Visit schedule and procedures

After providing written informed consent, all participants completed a detailed baseline questionnaire and underwent a complete clinical examination. Venous blood samples and samples from anal canal, oral cavity, urine and rectum were collected. After baseline visit, all patients were monitored quarterly for HIV infection and annually for STI screening through a complete clinical examination and collection of respective samples. Sexual behaviour was monitored biannually through a questionnaire. If HIV infection occurred, the individual left the study and was referred to a tertiary-care hospital. Safe sex counselling, condoms and lubricants were provided at each visit.

Questionnaires

Behavioural data were collected at the enrolment visit through a questionnaire administered by a staff member at the BCN Checkpoint community centre who was not the participant's primary caregiver. The information collected was as follows: sociodemographic characteristics (e.g. sexual practices, risk practices), history of STI, circumcision and drug consumption (e.g. tobacco, alcohol, cannabis, cocaine, intravenous drugs). In the follow-up visits, the questionnaire contained a reduced set of questions.

Clinical examination

A complete clinical examination, including detailed visual inspection of anal, penile and oral sites, and a digital rectal examination was performed at baseline and annually.

Sample collection

Capillary blood from the fingertip was obtained quarterly to perform a rapid test to assess HIV infection. A venous blood sample (5 mL) was drawn annually from the participant's forearm to assess syphilis and hepatitis A, B and C serologies. Urine samples and dacron swabs from rectum were collected annually by two trained clinicians to assess *C. trachomatis* and *N. gonorrhoeae* infections by molecular methods. Anal samples for HPV detection and genotyping and for Papanicolaou test, and oral samples for HPV detection and genotyping were obtained following the procedures of our group [18].

HIV and STI detection techniques

Screening for HIV infection was evaluated by the commercial Determine HIV-1/2 Ag/Ab Combo kit (Alere Healthcare, Barcelona, Spain). In case of a positive result, this was confirmed by Western blot analysis, enzyme immunoassay and/or enzyme-linked immunosorbent assay (ELISA). HIV virus load was assessed using Nuclisens (detection limit 80 copies/mL; bioMérieux, Durham, NC, USA).

The other STI were determined by lab techniques. For syphilis, serology was performed in two steps: first, a nontreponemal test was performed, and second, if the nontreponemal test was positive, a treponemal test was done to confirm syphilis infection. For hepatitis A, B and C serology, samples were assayed for anti-HCV, hepatitis B surface antigen (HBsAg), anti–hepatitis B core protein (HBc), anti–hepatitis B surface antigen (HBs) and anti–hepatitis A virus IgG and IgM (ADVIA-Centaur; Siemens, Munich, Germany; immunoassay method performed according to the manufacturer's protocol). *C. trachomatis* and *N. gonorrhoeae* infections were assessed by real-time PCR (Abbott Laboratories, Chicago, IL, USA). HPV detection and genotyping was performed using the commercial IVDCE F-HPV typing kit (Molgentix, Barcelona, Spain) [18].